

MEASUREMENT/TECHNICAL REPORT

FCC Part 15 Section 15-209-15.249

Logos Av Com

FCC ID: OM4TLVUCT4K

January 18th, 2000

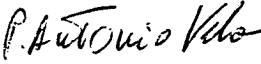
This report concerns (check one): Original grant ☒ Class II change ☐	
Equipment type: TELEVOTER CONTROLLER (ex.: computer, printer, modem, etc.)	
Deferred grant request per 47 CFR 0.457(d)(1)(ii)? yes ☐ no ☒	
If yes, defer until: _____ date	
Company Name agrees to notify the Commission by _____ date	
of the intended date of announcement of the product so that the grant can be issued on that date.	
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1 GENERAL INFORMATION

1.1 Product Description

EUT is a transceiver designed to be the central unit of a voting system; it works on 916.5 MHz frequency.

The Controller of the voting system is composed of the following elements:

a metal box containing:

- an electronic card for the power supply and the logic
- an electronic card for RF transmission and reception of data (transceiver), with No. 2 fixed antennas (welded to PCB)

The Controller can recognize up to 4096 voting keypads.

The equipment interrogates all available voting keypads (**FCC ID: OM4TLVKPD4K**) one at a time and receives from each keypad the data indicating the key/s that has/have been selected.

The information is stored in the internal memory of the voting keypad.

This data (identifying the voting keypad and the vote given) are sent to an outside PC through a serial port RS232 for the processing and displaying of the results.

1.2 Related Submittal(s)/Grant(s)

FCC ID: OM4TLVKPD4K

1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Model & Serial No.	FCC ID	Description	Cable Descriptions
US-UCT-4000 (1) s/n EMC-99-0319	OM4TLVUCT4K	Televoter controller	Unshielded power cord Shielded signal cable
Compaq Contura 420C s/n 7534HPE53700	CNT75MB2CC	Notebook	Unshielded power cord Shielded signal cables
Series 2862 s/n E4532433329T	None	AC adapter for notebook	Unshielded power cords
DM 119 s/n 3031602	DYKDM119	Printer, parallel I/F	Unshielded power cord Shielded signal cable

Remotely connected to:

US-KPD-4000 s/n 0201	OM4TLVKPD4K	Televoter Voting Keypad	No cable provided
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(1) EUT submitted for grant.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the ANSI C63.4-1992 test procedures . Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

TÜV QSL test site No. 3 (semi-anechoic chamber)

The semi-anechoic chamber test site and conducted measurement facility used to collect the radiated data are located at Via Montalenghe 12, Scarmagno, Italy. This site has been fully described in a report dated March 25, 1997 submitted to your office, and accepted in a letter dated August 4, 1997 (31040/SIT-1300F2).

1.6 Test equipment list:

Test receiver	Rohde & Schwarz ESH3	s/n 881364/012
LISN	Schwarzbeck NNLA8120	s/n 8120399
Test receiver/spectrum anal.	HP 8568B+QP adapter	s/n 2601A02134
Biconical antenna	Tensor 4104	s/n 2222
Log-periodic antenna	Electro-metrix LPA-25	s/n 1117
Spectrum analyzer	HP 8562A	s/n 3043A05627
Horn antenna	EMCO 3115	s/n 3572

2 PRODUCT LABELING

Figure 2.1 FCC ID Label

See attached file:

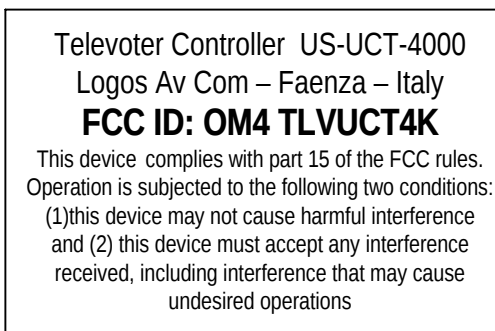


Figure 2.2 Location of the Label on EUT

See attached file:

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The EUT was configured for testing in a typical fashion (as a customer would normally use it).

In order to simulate a real application, the RS232 port has been connected to a Personal Computer (Notebook).

A voting keypad (FCC ID: OM4TLVKPD4K) has been placed in the chamber, at a convenient distance, in order to operate the EUT, but not to interfere with testing.

3.2 EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

The EUT has been tested in continuous transmission of data in both direction from US-UCT-4000 to US-KPD-4000 and return, in order to activate respectively the transmit and the receive section of EUT.

Note:

- transmission frequency was fixed
 - modulation was fixed
- (no regulation are permitted by the operator or factory settings)

Software used:

The P.C. software is used to communicate to the Televoter controller the kind of polling, the numbers of keyswitches enable, the numbers of voting keypads enable, and the numbers of the keyboard enable. The Televoter controller transmits the request of poll to the voting keypads and waits to the answer. This operation is made for every number of the voting keypads enable from the software of P.C.

After receiving of all polls the Televoter controller transfers the polling to the P.C and goes to sleep mode. Its wake up is controlled from P.C when it needs to do a new polling.

The voting keypads, after transmission of its data, close the transmitter. In this status the receiver is active.

3.3 Special Accessories

None.

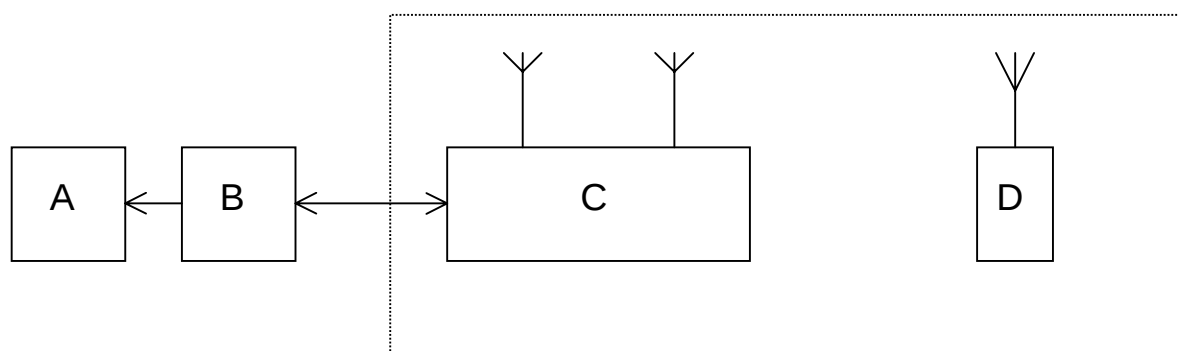
As shown in Figure 3.1 all interface cables used for compliance testing are shielded as normally supplied by Logos Av Com Company, the signal cable (RS 232) is integral part of EUT and sold with it.

3.4 Equipment Modifications

To achieve compliance to Class B levels, no changes were made during compliance testing.

3.5 Configuration of the Tested System

Figure 3.1 Configuration of the Tested System



A = Printer
B = P.C
C = **EUT** Televoter controller
D = Voting keypad (remote)

4 BLOCK DIAGRAM(S) OF THE EUT

4.1 Block Diagram Description

The Controller Board of the EUT is provided with:

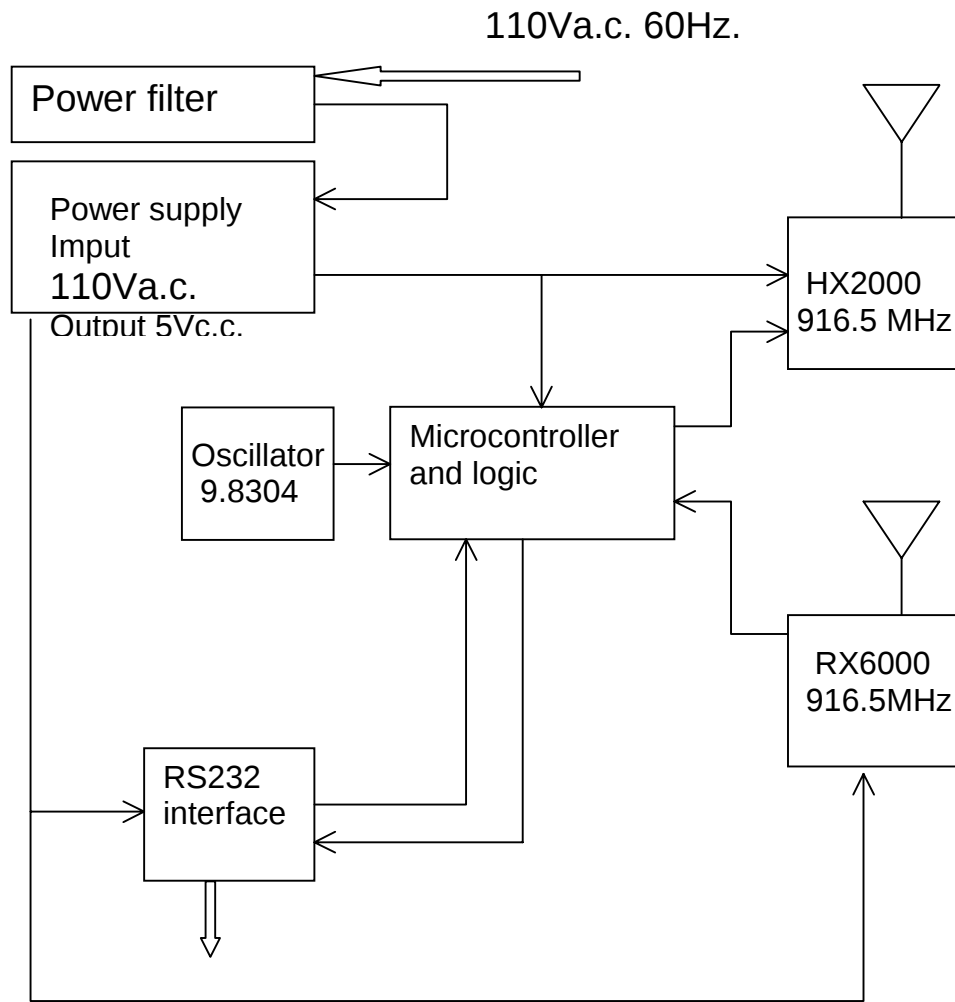
Crystals and oscillators:

- Quartz oscillator model MEC DH1100S-9.8304MHz
- Tx hybrid model RFM HX2000 916.5 MHz
- Rx hybrid model RFM RX6000 916.5MHz

RF suppression devices:

- Power supply filter model ACTRONIC type ARO 5.2.5A
- Split sleeve core with plastic case model MEC MSFC6KEX on serial cable (inside EUT box)

Fig. 4.1 - Block Diagram of the EUT



5 CONDUCTED AND RADIATED MEASUREMENT PHOTOS

See attached files : uctcondfront.jpg
 uctcondside.jpg
 uctradfront.jpg
 uctradback.jpg

6 CONDUCTED EMISSION DATA

6.1 Tests of the worst case configuration.

The conducted tests are performed with a receiver in quasi-peak mode.

	Frequency (MHz)	Measured* (dBμV)	Limit (dBμV)
neutral	0.76	31	48
	1.1	35	
	1.3	33	
	9.8	46	
	16.2	35	
	19.7	40	
line	0.76	32	48
	1.1	34	
	1.3	34	
	9.8	47	
	16.2	34	
	19.7	41	

* All readings are quasi-peak

Test Personnel:

Tester Signature  Date January 17, 2000

Typed/Printed Name Giuseppe MECCHIA

7 RADIATED EMISSION DATA

- frequency range 30 MHz – 10 GHz (10th Harmonic of highest fundamental frequency generated).

7.1 Tests of the worst case configuration

The following data list the significant emission frequencies, measured levels, correction factors (including cable and antenna corrections), the corrected reading, plus the limit. Field strength calculation is given in paragraph 7.2.

Judgement: Passed by 2.1 dB

Spurious emissions (limits according to section 15.209).

Frequency (MHz)	Polarity (V/H)	Receiver* Reading (dBμV)	Correction Factor (dB/m)	Corrected Reading (dBμV/m)	3 Meter Limit (dBμV/m)
68.6	V	17.6	10	27.6	40
147.3	V	22.1	14.5	36.6	43.5
167	V	17.2	15.6	32.8	43.5
216	H	21	14.1	35.1	43.5
304	H	18.8	17.9	36.7	46

Fundamental and harmonics (limits according to section 15.249).

916.5	V	55.5	30.5	86	94
1833	H	15.6	27.6	43.2	54
2749.5	V	21.9	30	51.9	54
4582.5	V	16	34	50	54

* below 1 GHz readings are quasi-peak, with an IF bandwidth of 120 kHz,
above 1 GHz are peak with an IF bandwidth of 1 MHz.

Test Personnel:

Tester Signature



Date January 17, 2000

Typed/Printed Name Giuseppe MECCHIA

7.2 Field Strength Calculation

7.2.1 The field strength is calculated by adding the Antenna and Cable Factor to the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where

FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 55.5 dB μ V is obtained. The Antenna and Cable Factor of 30.5 is added, giving a field strength of 86 dB μ V/m. The 86 dB μ V/m value was mathematically converted to its corresponding level in μ V/m.

$$FS = 55.5 + 30.5 = 86 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(86 \text{ dB}\mu\text{V/m})/20] = 20,000 \mu\text{V/m}$$

8 PHOTOS OF TESTED EUT

- Fig. 8.1 Front view**
- Fig. 8.2 Rear view**
- Fig. 8.3 Internal view with cover removed**
- Fig. 8.4 Electronic board (power supply and logic) - components side**
- Fig. 8.5 Electronic board (power supply and logic) - foil side**
- Fig. 8.6 Transceiver - components side**
- Fig. 8.7 Transceiver - foil side**

See attached files: reference picture 8.1 to 8.7

User Manual

See attached file : UCT manual.doc